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Management Productivity Schemes in R.A.F. Support Command

J. D. ROTHERY, O.B.E., Ministry of Defence

Jack Rothery is Command Management Services Officer in R.A.F. Support Command, where he is responsible for productivity services (including O & M and work study) and management accounting. In the article that follows he describes the introduction of management productivity schemes in the Command that have led to substantial cost savings. —*Editor*

Introduction

In their Report of June 1966 on the pay of industrial civil servants,* the National Board for Prices and Incomes recommended, among other things, that 'since the initiative in improving the utilization of manpower can be more effectively taken locally than nationally, the Government should consider the desirability of allowing local management, within the limits of a financial budget, greater discretion to decide numbers and grades of workers employed, and local management should be complemented by strengthened arrangements for central management services. One of the first aims of a strengthened management services organization should be to help to devise a budgeting procedure and to institute pilot schemes for promoting greater efficiency, leading to the development of a phased programme of reform. Gains accruing from the better utilization of labour and greater efficiency should be appropriately shared between the workers and the employer who is in this case indirectly the taxpayer'.

Concurrently a Treasury Committee had concluded that there could be improvements in the utilization of industrials in Government civilian industrial establishments.

The Report was welcomed by both the official and trade union sides of the industrial Civil Service and, as most of the large industrial establishments in the Air Force Department are controlled by Support Command, the Command has been actively concerned in follow up action.

The result has been the development of what has come to be known as the Support Command Management Productivity Schemes, the aim of which is 'to improve the cost-effectiveness of the labour component of the civilian manned engineering and supply units in the

* N.B.P.I. Report No. 18, *Pay of Industrial Civil Servants*, Cmnd. 3034.

Command by the promotion of greater efficiency with the setting up of more effective management controls'.

R.A.F. Support Command

Support Command is by any measure a large organization. The total complement of about 23,000 includes 13,400 industrial and non-industrial civil servants. The Command stretches from Carlisle in the north to Chilmark (near Salisbury) in the south, from Swanton Morley in East Anglia to St. Athan in south Wales. In addition, there are two major units in Northern Ireland. The main responsibilities of the Command include supply and engineering. In the supply role the Command holds over 200 million items of equipment covering 1·2 million reference numbers and makes about 10,000 issues every working day. In its engineering role it repairs aircraft and aircraft equipment, prepares aircraft for issue, and incorporates modifications. It is also engaged in general engineering tasks, electrical and electronic engineering, and gas production. In essence, therefore, Support Command provides the logistic support for the Royal Air Force.

Employment of consultants

Because of the lack of experienced Management Services staff in the Air Force Department at the time and, indeed, in the Ministry of Defence and Government service generally, it was accepted that, initially, management consultants should be employed to advise and assist in the field of productivity.

The Management Services Division of Treasury—now part of the Civil Service Department—provided a list of ten possible consultants, from which three were invited to tender.

Since the consultants were to cover a fairly wide field of Air Force Department organization and responsibility, it was decided from the outset to associate with them a civil servant who knew the Department and the Royal Air Force. His aim was to interpret departmental methods and attitudes, and to ensure that any recommendations which the consultants proposed to make on the wider aspects of management were feasible within the framework of Government policy and departmental organization. As Head of OM 1(Air), and the individual who had done much of the ground-work following the NBPI and Treasury reports, the author was appointed first as the 'liaison' officer—and later as the Command Management Services Officer to develop and install the schemes.

Following preliminary studies by the three firms of consultants at two selected RAF civilian manned units, and evaluation of their proposals, P.A. Management Consultants were selected to carry out a thorough study within strict terms of reference.

Decision to proceed

The consultants' report confirmed the kind of action that was needed, and the Air Force Board agreed to:

(*a*) The setting up of method study and work measurement at the civilian industrial establishments in Support Command.
(*b*) A trial being conducted at No. 14 Maintenance Unit, Carlisle—a large supply unit—and at No. 23 Maintenance Unit, Aldergrove—a large engineering unit—with the ultimate aim of introducing incentive schemes for the civilian industrial staff.
(*c*) P.A. Management Consultants being employed to assist in an advisory capacity.

The decision to proceed with the development of management productivity schemes was not taken lightly. It was recognized that there would be a need for an intensive and sustained programme of training for managers, both Service and civilian, who were almost wholly unfamiliar with the techniques of managing civilian industrial type installations with systems of work measurement and associated management controls, and with incentive wages systems. It was also recognized that much effort would be needed to bring into being and maintain a body of managers with the necessary knowledge, skills and personality. It was known, too, that entirely new problems would arise that would add to the burden of staff and that much effort would be needed by management generally to keep the schemes up to date and viable. Lastly, it was recognized that it would be necessary to strengthen the Management Services organization at Command headquarters and at the units concerned.

The original plan to develop the schemes at two trial units, and then to develop schemes at a further nine units, had to be abandoned because of the long time-scale involved. Accordingly the schemes had to be developed simultaneously at all 11 units* whose functions covered the major servicing of aircraft and electronic equipment, warehousing, production of oxygen and hydrogen, ammunition storage, and publications and forms. At one unit servicemen and civilians worked side by side, while at two others separate Service and civilian elements worked closely together. The decision to proceed on a wider front than originally envisaged threw a much larger workload on the small Command Management Services staff.

Aims of the schemes

As mentioned earlier, the overall objective was to increase productivity and efficiency by setting up more effective and positive management controls. Work embraced:

(*a*) Method study within the facilities available.
(*b*) Introduction of work measurement to enable subjective guess-work and opinion to be replaced by fact—an essential pre-requisite for meaningful control in any work situation.

* The schemes are now being developed at two further units in the Command. —*Editor.*

(*c*) Design and implementation of labour budgeting—since manpower represented a very high percentage of costs in the units in question, it will be appreciated that this has a strong financial element.
(*d*) Training of line management at all levels to give them the knowledge and skills necessary to apply to the best advantage the new methods and techniques.
(*e*) The development of productivity payment schemes, based on time standards derived from work measurement, for application to the civilian industrial staff.

Management accounting was also being developed at the 11 units concerned using much of the information derived from the management productivity schemes. The simultaneous development of the schemes and management accounting was a complex exercise requiring the full and active support of management at all levels.

Development programme and control

After approval of the schemes by trades unions at national level and their acceptance by the local Whitley Works Committees, development work at each unit was planned to take some 2½–3 years, in three phases:

(*a*) Phase 1, of about six months, covered the collection of reference period data, the planning of work study, appreciation talks to staff, the setting up of local Joint Productivity Sub-Committees and the carrying out of a manpower analysis.
(*b*) Phase 2, of 18–24 months, included various studies, work measurement, preparation of work specifications and set-ups (documents detailing the derivation of standard time values), preparation of controls and the training of management in their use.
(*c*) Phase 3 covered negotiations with local unions and implementation of actual incentive schemes, together with the application of final management controls.

Productivity schemes are unlikely to be successful unless the participants are committed to making the arrangements work. This applies not only to the men on the shop floor, but to all levels of management. In the Support Command schemes, Command Headquarters at Andover exercised overall control with executive action through the usual Royal Air Force chain of command. Responsibility for co-ordination at unit level rested with the Commanding Officer, and at Command Headquarters with a Management Productivity Schemes Executive Committee, with monitoring by the Command Management Services Officer. The Executive Committee, which met every four weeks or so, was chaired by the Senior Air Staff Officer (an Air Vice-Marshal) and consisted of the Air Officer Engineering, Air Officer Supply, Command Civilian Administration Officer, the Command Management Services Officer and the Group Captain Organization. Thus, senior officers in the Command organization were very closely involved in the development of the schemes.

So that senior management in the Ministry of Defence could keep abreast of developments and take decisions on matters that fell outside the authority of the Executive Committee, a Steering Committee was formed and met every three or four months. The Senior Air Staff Officer also chaired this Committee, which consisted of members of the Executive Committee and Air Force Department representatives covering engineering, supply, finance, accounts and civilian personnel policy. Estimates of expenditure and savings, as well as progress reports, were presented regularly. During the time that consultants were employed, the senior consultant attended most Executive and Steering Committee meetings.

Outline of work at units

In Phase 1 Management Services staff at each unit carried out a manpower analysis which included over one million pieces of self-recorded data and some 300,000 individual observations. This analysis gave an indication of:

(*a*) Level of labour effectiveness.
(*b*) Estimated labour requirements—assuming a constant workload—once the schemes were implemented.
(*c*) Labour turnover and wastage.
(*d*) Excess labour at varying workloads after implementation.
(*e*) Likely reduction in overtime once the schemes were implemented.

The analysis also indicated the broad order of magnitude of productivity increases together with labour reductions. It was recognized that the figures, which were only projections, could be affected by variations in workload, labour wastage and so forth. Nevertheless, they gave a good idea of the possible increase in productivity. The analysis suggested that at constant workload the manpower level might, on average, be reduced by some 40 per cent after controls and incentives had been applied. In other words the average increase in productivity could be about 60 per cent or so—the percentage varying, of course, from unit to unit and section to section.

The workload in each section was measured in relation to the type of work and performance of the industrial staff, the standards being used as a basis for planning and progressing task programmes; management control information; work measurement data bank; and productivity payments.

Controls, matched to the varying needs of the different levels of management, were devised to indicate the effectiveness with which the labour force was being used and the extent to which labour budgeting aims were being achieved.

Work measurement

The aim of work measurement is to find the work content of a job, that is, the time in which it should be completed at a stated level of performance.

The work content is expressed as the standard time (which may be a standard hour or a standard minute) at standard performance (100 BSI). These standard times are built up from observations of the basic time required to perform the job, and corrected for rate of effort. To this may be added 'occasional elements' (such as, refer to drawings, get parts from rack, etc.), a contingency allowance (covering short work delays which inevitably interrupt the carrying out of almost any job) and a relaxation allowance for personal needs, fatigue, etc.

The performance index used is the single linear British Standards Institution (BSI) rating scale from 0–100+ against which an individual's rate of effort is gauged.

Work measurement enables target times to be set and thus forms a basis for productivity payments, and it is this application that usually springs to mind when work measurement is mentioned. However, it is not limited solely to providing a foundation for incentive schemes, important though this may be, since they permit higher wages and lower costs at the same time. In the long run it is the use of work measurement:

(*a*) as an aid in the development of methods and the comparison of one method with another (in which use it is an integral part of method study);
(*b*) as a guide to labour requirements for planning manpower;
(*c*) to assist work scheduling and work loading;
(*d*) to control work and labour by comparing expected performance with actual achievements—in other words a productivity indicator;
(*e*) to allocate labour and machine costs, e.g. the building up of actual or estimated costs of a job;

which results in improvements in labour control, work planning and method investigation that are the advantages to management.

Various work measurement techniques are used in Support Command, the most suitable being selected in each circumstance. They include *Time Study*, *Rated Activity Sampling*, *Pre-determined Motion Time System* and *Categorized Work Values* or *Comparative Estimating*; all of which will be familiar to most readers of this journal.

Code of Guiding Principles

An essential document with any productivity payment scheme is the *Code of Guiding Principles*, often referred to as the 'Code of Good Practice'. The concept behind the Code is that it forms a statement of intent and includes all the points of principle to be observed in framing the productivity payment schemes.

Key points in Support Command's Code, which first had to be accepted by the trades unions at national level and the local Whitley Works Committee at each unit, include:

(*a*) The need for close consultation between all concerned at all levels and the introduction of Joint Productivity Sub-Committees of the Unit Whitley Works Committee.

(*b*) No enforced redundancy at the instigation of the Department. In other words surplus labour was to be shed by natural wastage or voluntary methods.
(*c*) Measurement of performance and measured work.
(*d*) The need for aircraft safety, quality standards and observance of safety regulations.
(*e*) A list of techniques to be used.
(*f*) Payment of a bonus of one-third basic pay for a performance of 100 BSI with bands of performance.
(*g*) Productivity payments not to be made for waiting time, holidays, sickness or other similar causes unless specifically authorized by management.

The Code also allows for times or targets to be reviewed regularly and specifically when there is a change of method, equipment, working conditions, a change in specification, or where there has been an error or miscalculation.

Stepped Payment Plan

A standard productivity payment scheme called the Stepped Payment Plan (SPP) applying to all units was designed. Basic requirements of the SPP, which is a component of the Work Specification Part 1 (see below), include:

(*a*) Work to be measured to produce standard times.
(*b*) Bonus starts when Pay Performance (PP) rises above 75 BSI.
(*c*) One-third bonus paid at a PP of 100 BSI (standard performance).
(*d*) Maximum bonus of 50 per cent at 120 BSI.
(*e*) PP calculated for groups of staff.
(*f*) PP calculated over a review period of four weeks, with the ensuing percentage bonus earned by the group paid to the individual based on his attendance hours during the following review period.

Averaged over a year, and after taking into account leave, sickness, etc. (when no bonus is paid), productivity payments average 25 per cent or so.

The bonus, which is on a sliding scale, provides an immediate incentive for a group to move up to 100 BSI, since up to that point the law of increasing returns applies. Above 105 BSI, the returns diminish. This encourages the workforce to aim at 100–105 Pay Performance which, from management's point of view, provides consistency for forecasting and control purposes.

Work Specification

The *Work Specification*, which describes how a productivity scheme works, is essentially an agreement between management and staff on all matters relating to the payment of a bonus.

Part 1

Part 1, which is negotiated locally and agreed with the local trade

union representatives at the unit and trade union district or area officials, sets out the general conditions applicable to the Command and unit as a whole. It covers: Stepped Payment Plan; lost time; standard times; safety and quality; mobility of staff; training allowance; and implementation of schemes.

Part 2

Part 2 of the Work Specification is unique to each section or group being applied on incentives. It is prepared before a particular scheme is implemented, and has to be accepted by Command Headquarters before it is agreed between management and staff in the section. The contents of Part 2, which automatically becomes part of the normal conditions of work at the end of the trial period (usually six months) subject to incorporation of any agreed changes resulting from the trial, include: the section task, equipment used, duties and responsibilities in detail; methods of working; standard times for most jobs in the section; required manning level to cope with the section task; bonus scheme for the section or group of staff; work recording and work checking; and training allowance.

Implementation

In the supply areas where there is a fairly constant workload, the number of industrial staff has been reduced. In the engineering areas, whilst the numbers employed have remained roughly the same, more work is being carried out.

The implementation programme started in mid-1970 with a target completion date in early 1974. Delays in obtaining sufficient qualified management services staff, coupled with longer than anticipated negotiations with the unions, have extended completion until late this year, but there are already 150 schemes in operation covering some 5,000 industrials, each of whom has been provided with a booklet explaining the basis of productivity payments. Each manager directly involved has been given a *Managers' Guide.*

Problems

Some unions are averse to reducing labour. This has caused problems in areas where there is only a fixed amount of work to be done, and has delayed the introduction of schemes.

A second problem is that, where the plan has been to achieve an increased work output, there is a danger that this can take the form of extra work being done, e.g. finishing to an unnecessary high standard, at the expense of real increased output.

Another problem arose at the aircraft engineering units where an increase in the number of junior supervisors was necessary to cope with the expected greater amount of work. This coincided with the introduction of a new quality audit system and computer networking analysis,

and shortages therefore developed in the quantity and experience of junior supervisors.

Performance indices

Five main performance indices are used to determine whether the schemes are functioning as intended:

(*a*) *Pay Performance* (*PP*). This is a measure of the number of credits earned relative to the number of attendance hours, and gives an indication of the amount of effort staff are putting into their work. If a scheme records a PP of 90 BSI or below, or above 110 BSI, checks are made to find out why.

(*b*) *Effective Performance* (*EP*). This is a measure of how effectively staff are working. It is arrived at by adding together all the credits earned for productive work—that is, work that the section was created to do—and dividing this by attendance hours. The aim is that EP should nominally be in the region of 70–80 per cent of attendance time. An investigation is warranted if it falls below the target.

(*c*) *Ratio of direct to indirect workers.* Although the ideal is to measure all the constituent parts of a section's workload and give each a standard time, this is not always economical or practicable. Where work can be measured and controlled a calculation can be made of the number of men required to do it—these are known as *direct workers*. Where work cannot be economically measured, or where it is not easy to control, a calculation based on rated activity sampling is made of the number of workers who will be required to do it at 100 BSI—these are known as *related indirects*. The ratio used is:

> (Recommended direct manning) − (Supervisory time) − (Total non-attendance time of both directs and indirects): (Recommended indirect manning) + (Supervisory time)

If this ratio is exceeded on two or more occasions, or if the number of indirects exceed the number authorized, an investigation is warranted.

(*d*) *Waiting time.* If the total amount of waiting time exceeds a certain proportion of the total time available it will warn management that all is not well. The action limit for this control has been set where the total waiting time is equivalent to one direct employee. Thus for a scheme with 100 directs the limit is set at 1 per cent, whilst for a scheme with 20 directs it is set at 5 per cent.

(*e*) *Cost per Productive Standard Hour* (*PSH*). Since the aim of each scheme is to increase productivity, there should be a decrease in unit cost at constant prices. The costs used are for labour only—that is, actual wages plus an element for personnel overheads. They are up-dated at regular intervals and should not be confused with gross

costs which would include elements for all overheads and *materiel*. The cost per PSH is calculated by dividing the labour cost of all industrial workers, direct and indirect, by the number of productive standard hours of work produced. Current costs per PSH are compared with the cost predicted when the scheme was devised.

Profitability

Although generally in the Command's engineering areas we have not reduced the number of staff, our aim was to reduce the overall industrial strength at the 11 units originally involved from about 7,300 to 5,000. This has already been achieved.

Allowing for management productivity scheme administrative costs—including consultants—we broke even in late 1972. The accumulative savings (excluding non-effective benefits) up to July 1975 have amounted to £7·7 million. On-going savings based on current pay rates and work authorized by local management are £4·5 million a year rising to £5·9 million if pension and gratuity liability are included. The overall effective performance has increased over the reference period by some 70 per cent.

Benefits

Apart from the obvious operating cost savings the main benefits have included:

(*a*) Increased control by management made possible by the better control and productivity information now available.
(*b*) Improvements in local management and supervision. This comes from above—generated by the controls—and from below, by the desire to maximize earnings.
(*c*) A new outlook in industrial relations on the part of management and staff.

Work in Service areas

It has now been agreed that work measurement of Service personnel and the introduction of associated controls should proceed in Service-manned areas of the Command's engineering and supply units with the aim of improving productivity and so reducing the cost of work done. Clearly monetary incentives cannot be applied in these areas; nevertheless, times for jobs can be adjusted to an optimal performance level.

Energy Economy in Government Buildings

H. P. JOHNSTON and A. C. GRONHAUG,
Department of the Environment

Mr. Johnston is Deputy Chief Executive III and member of the Property Services Agency Board responsible for the Directorates of Defence Services I and II, and Post Office Services; Mr. Gronhaug is Director of Engineering Services Development. The article that follows describes the work undertaken by the Property Services Agency of the Department of the Environment on energy conservation and energy management since 1972; and is based on a paper presented at a recent joint conference on Energy Conservation and Energy Management arranged by the Institution of Heating and Ventilating Engineers, the Illuminating Engineering Society, the Institute of Fuel and the Department of Energy. The full paper will be published in 1976 as part of the Conference proceedings and will be available from the Construction Industry Conference Centre Ltd, P.O. Box 31, Welwyn, AL6 0QE.
—*Editor.*

Introduction

Fuel expenditure in the financial year 1974–75 was approximately £25 million in the civil estate and £60 million in the defence estate. Further analysis of fuel costs into the average amounts paid for coal, oil, gas and electricity across the board shows that electricity is the most significant element, accounting for one-third of the total energy cost.

In the period 1964 to 1975, the fuel bill for Government buildings trebled, primarily as a result of price increases. But while the increases in the last two years have been particularly heavy, the upward trend was apparent earlier and had already led to a number of new initiatives aimed at improving performance and reducing the rate of cost increase before the recent crisis broke. The Property Services Agency (PSA) was, therefore, in a relatively strong position to respond quickly to renewed calls for national energy savings once the full extent of the new situation became apparent.

From this starting point a revised and easily implemented policy was evolved, of which the main features comprise: a declared aim to achieve a defined savings target; a restated commitment to uphold nationally agreed standards; a requirement for all measures implemented to be economic in terms both of costs in use and of staff resources; and a decision to operate the conservation programme, so far as practicable, on a self financing basis, using the actual savings achieved in one year to determine the size of the capital investment to be provided in the next.

The savings target chosen has been set to achieve an overall reduction of 30 per cent in the annual fuel consumption over a five-year period from 1974. This target may prove eventually to be impracticably high,

but was set at this level in order to highlight the importance attached to energy conservation in its own right; to encourage inventiveness and initiative in the approach to energy conservation, for both existing and new buildings; and to provide sufficient leeway to ensure that, as further energy price rises occur, any marginal schemes which may then become economic can be kept in mind and reassessed.

Existing organizations and procedures

Since the new energy conservation policy adopted is evolutionary, not revolutionary, in concept, it is worth examining briefly the main features of the existing organization and procedures which have proved to be of greatest benefit.

Foremost among these is the system of planned preventative maintenance which has been developed over 30 years and is now well proven. It establishes performance criteria and standardizes routines covering operation as well as maintenance requirements for all the most important and sensitive items of mechanical and electrical plant and equipment.

While this planned maintenance system may not suit all organizations, the important point is that without a sound maintenance and operation base, it would be impossible to judge the efficacy of energy conservation measures with any degree of assurance. Some system performing an equivalent function and similarly establishing maintenance and performance norms is, therefore, an essential prerequisite to any sound energy saving policy.

As an addition to the planned maintenance organization, a small Fuel Economy Unit was formed in 1972 to provide a centralized approach to the efficient and economical use of all fuels and to explore and exploit possible ways of controlling and reducing expenditure.* The Unit is fully accountable in its own right and has from the outset had to pay its own way.

The Unit is responsible for the optimum start control programme which has been particularly valuable because, as energy prices have escalated, the return on investment has been exceptionally rapid and it has been possible to demonstrate that further measures can be funded from money which otherwise would have had to be set aside to meet fuel bills. In short, this work has effectively helped to prime the pump in support of the enlarged conservation programme now under way.

It is also worth mentioning the specific financial procedures that are used both to decide on the best choice of fuel in particular cases and to assess the merits, or otherwise, of additional capital investment in order to produce longer-term overall savings in operating and maintenance costs. These procedures follow the conventional discounted cash flow route, using test discount rates agreed with the Treasury and relative

* The early work of the Fuel Economy Unit was described in an article by P. Henderson in the May 1974 edition.—*Editor.*

rates of change in fuel prices agreed with the Department of Energy. The procedures are not necessarily applicable outside the public sector, because they do not distinguish between capital and revenue accounts, nor do they need to include an allowance for taxation. But there is no doubt that such procedures help to create a situation in which individual initiatives in support of soundly based energy conservation measures can readily flourish.

Improving performance

In spite of the helpful factors described, work on energy conservation has not been altogether plain sailing. In particular, problems have been encountered in fuel monitoring and in tariff selection and control.

Fuel monitoring

Under the planned maintenance system, fuel consumptions are monitored and a check is kept on combustion efficiencies. But these procedures do not ensure that fuel is used economically in installations outside boiler houses, and further checks are necessary to establish likely areas for economy.

Various methods are theoretically possible to meet this need, including the comparison of consumptions over a period, making due allowance for changes in weather and usage. But comparisons of this kind are never absolute and fall down because they fail to identify consistent misuse. An alternative approach would be to compare actual consumption with a norm or target, but setting norms is difficult due to the very wide energy variation experienced between the best and the worst cases of apparently comparable buildings serving the same kind of function.

The approach adopted has, therefore, been to produce a graph (see *Figure 1*) in which fuel consumptions for each week of a heating season are plotted against the average outside air temperature for the week. If the inside air temperature is maintained at a constant level for the occupancy period, the relationship shown on the graph will be approximately linear, although the actual measured values will produce a considerable scatter of points due to the random effects of wind, rain, solar and internal gains, etc. However, the best fit straight line through the points plotted can be simply calculated using one of the available computer programs and, with the issue of meteorological data for average weekly air temperatures centrally, the whole operation can be carried out by clerical staff very easily.

When the graph has been completed, the line AB shown in *Figure 1* represents the fuel consumption when heat is provided for both space heating and other purposes not related closely to outside air temperature, such as domestic hot water services. The line BC represents the fuel consumption during the period when heat is provided for the latter only and the intersection of the two lines at point B should occur when the average outside air temperature corresponds to the 'no-load'

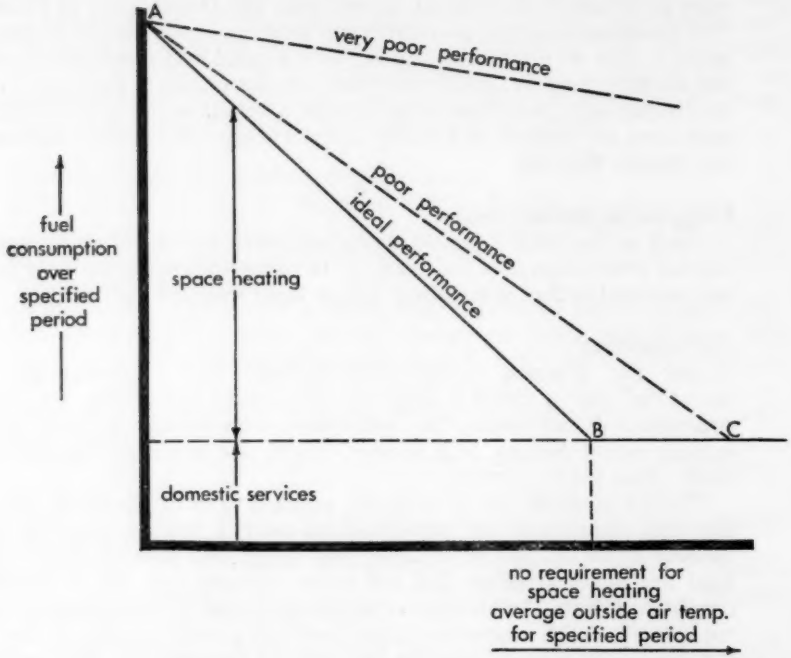

FIGURE 1 HEATING SYSTEM PERFORMANCE LINE

condition. If point B occurs at an average outside temperature much greater than about 18–20°C, then the building is normally overheating. In extreme cases of very poor performance, the plotted performance line would approach the horizontal.

This procedure is quite new and has yet to prove itself completely. But early indications are that in spite of the approximate nature of the results obtained, it provides a cheap and simple means of identifying the cases most deserving of attention. It is, therefore, useful in setting priorities and in concentrating attention on those areas where corrective action will pay the best dividends.

Tariff selection and control

It is, perhaps, obvious to point out that tariffs need to be selected and used with care. But, in a large organization with many thousands of separate agreements, centralized accounting procedures and subject to changes in organization, staffing and responsibility, particular cases can easily be overlooked and considerable waste incurred.

Our investigations showed that, in many cases, tariffs had not been amended to take the best advantage of changing circumstances. The

position is not made easier by the different methods of charging adopted by the various Electricity Boards.

Fortunately, part of the answer to these sort of difficulties lies in the fact that accounts have been centralized and full details are held on one computer. It has been possible to prepare new computer programs for analysis purposes and, as a first stage, an investigation was carried out to determine whether electricity accounts charged on block or flat rate agreements could be improved by changing to maximum demand tariffs. In order to estimate maximum demand in those cases where consumption only had been recorded, a survey was carried out of 200 accounts already being charged on a maximum demand basis and having varying consumption patterns. Details of all cases found worthy of further investigation were printed out and about £300,000 of cost savings were achieved in 1973/74 following renegotiation.

A more extensive review is now about to be launched as a second stage and will include the progressive recording of consumptions and costs incurred on all electricity and gas accounts. Calculations to determine the energy costs per unit of electricity or therm of gas will be carried out and the lowest cost tariff available will be indicated if not already adopted.

Meanwhile, a separate survey of electricity accounts for the civil estate has shown that at least 100 properties had a power factor which made the provision of correction equipment cost-effective, the capital outlay for the most part being recoverable within three years. The potential in the defence estate is thought to be even greater. To cover the ground completely a national contract has been let to cover about 1,000 properties. Total expenditure on the contract is expected to be of the order of £250,000, with potential savings of about £100,000 per annum.

Energy studies: heating installations

Space heating accounts for the most significant use of energy in Government buildings. Most existing buildings are naturally ventilated and heating is provided by conventional hot-water systems served from central boiler plants. Oil still predominates as the fuel source, although many coal- and gas-fired plants are also in service.

From this starting point the scope for major alterations to existing systems to improve energy performance in cost-effective terms is limited. However, considerable improvement is possible through straightforward action on draught-proofing and insulation levels; by closer attention to the needs of users and, if need be, their re-education; by improvements to control systems; and by better operational procedures and techniques.

As already stated, work in this field began with the installation of optimum start controls to intermittently occupied office buildings in the civil estate. Some 1,500 buildings have been converted and the annual savings resulting from this work now amount to over £1 million, for

about the same capital cost. This work is being extended into the defence estate, where the potential savings are estimated at £10 million per annum for a capital outlay of the order of £20 million.

Improvements in capacity control may well involve internal temperature sensing. Many Government buildings heated by hot-water systems are fitted with some form of compensator control which varies the water flow temperature to the heat emitters, according to outside air temperature. However, in practice, such systems usually have to be set up to satisfy the coldest area on the north face of the building and, not infrequently, the remainder of the building is over-heated, sometimes severely in rooms subject to solar heat gain.

Attempts have been made to allow for the effects of solar gain by introducing zones controlled by solar and wind compensated outside detectors. But these rarely work satisfactorily and in most cases are difficult, if not impossible, to set up correctly due to the varied effects of shading and wind. Indoor temperature sensing avoids these difficulties, though in many existing installations it raises other problems such as the need to modify pipework and heating circuits. A gain in fuel performance will not always pay for such modifications and it is recognized that installations employing continuous perimeter natural convectors pose a particularly difficult problem. Even so, considerable scope for improvement in this area remains and many authorities agree that savings of about 15 per cent are possible from this source and our studies bear this out.

Further work in the electrical field

A survey of electricity consumption patterns in a sample of 16 medium-size non-air-conditioned Government office buildings has shown that approximately 65 per cent of the electrical energy consumed is used in lighting, with the balance being taken by lift installations and other general power services.

A recent study in one office building in the London area showed that lights were in use for a typical period of about 3,500 hours per annum, compared with a theoretical need in normal shallow plan naturally lit buildings of about 1,000 hours. The difference in these figures indicates the considerable scope for energy economy through voluntary action by building occupants in the economical use of lighting.

It would, however, be wrong to lay the whole blame for uneconomic operation on the building occupants. Further studies have shown that a major factor in the cost of office lighting is the practice of cleaning during the hours of darkness. It is commonly found that well disciplined staff will switch off all lights when they leave at the end of the day, but an hour or two later when the cleaners move in the complete lighting system tends to be switched on again in order to facilitate the flow of cleaning work.

A particular study indicated that if cleaning is restricted to the beginning and/or end of the occupancy period a total net cost saving

of 19 per cent can be effected. From this experience the lesson to be learned is clear cut and, at the very least, future cleaning contracts need to be arranged with the energy cost implications taken into account.

Further improvement in lighting performance is often possible by rearranging circuits and switching. In many existing buildings the present switching arrangements are often unable to provide economic control because they do not discriminate between the different needs of supplementary daytime lighting and full artificial lighting after dark. Various alternative switching configurations are possible to provide increased discrimination and there is little doubt that in future the most efficient installations will include provision for changing over lighting levels from day to night operation; for reducing supplementary lighting near windows on bright days; and for providing nominal lighting levels for cleaning purposes.

Control of lighting installations engineered to meet these new requirements can be arranged either manually or automatically. Automatic control by means of change-over switches and photo-cell sensors implies a degree of loss of amenity, and can bring adverse reactions from staff. However, to some extent, these can be overcome by providing individual local desk lighting and such provision will, in any case, often lead to further energy saving by individuals, many of whom prefer to work under local rather than general lighting conditions. Further investigations are in progress on this and related problems.

In another area, tests have shown that there is little scope for energy economy in lift installations. Most modern lifts are already engineered to regenerate when a full or nearly full car descends or when an empty or nearly empty car ascends. In addition, if a lift installation has been properly designed and sized for the correct building population in the first place, there is seldom point in attempting to achieve economy by taking one or more of a group of lifts out of service.

Catering installations

Bulk catering installations are provided in many Government buildings, and, since such installations are by their nature energy intensive, a number of investigations are being undertaken into methods of reducing energy consumption in this field. The potential level of savings thought to be achievable is estimated at £3 million per annum.

Several areas are under investigation, of which the most important is possibly the development of an automatic sensor to detect whether boiling rings are covered by pans. Considerable energy is wasted by catering staff who tend to switch on boiling rings at the beginning of a working shift and to leave them on throughout the period, whether cooking is in progress or not. A development contract has therefore been let to study gas systems in detail as a first phase, and a prototype sensor has now been submitted to British Gas for evaluation.

On the electrical side, trials have recently been completed of a new

bulk storage water heater for tea making in offices, which has been designed to include a thermostatically controlled main element, supplemented by a boost element which the user controls by means of a push-button. In use, the temperature of the water is maintained just below boiling point and it is only brought to the boil by means of the supplementary element as boiling water is required. The trials of this unit have shown that it uses 60 per cent less energy than the normal continuously boiling tea urn.

Further work being undertaken includes the development of new automatic ignition systems for gas appliances to eliminate pilot lights; the provision of manual reset timers for cooking grills, to allow cooking times to be predetermined and controlled automatically; and tests on hot cupboards at serving counters, where it has been found that cabinets with very high insulation levels can show an energy saving of 18 per cent compared with the normal commercial equivalent.

The catering field is a fruitful one for energy conservation, in another sense too, when it is borne in mind that, however efficient or inefficient particular items of equipment may be, it is often possible to recover the wild heat from kitchens and re-use it by means of thermal wheels or similar techniques to warm the adjacent dining and bar areas.

Conclusion

There is nothing peculiar about Government buildings, except possibly their quantity, and most of the activities mentioned in this article should generally find echo in other organizations, public or private, equally concerned to obtain the best value for money and to make an honest and worth-while contribution towards conserving the dwindling world resources of fossil fuels.

A note of caution is necessary in case anyone should assume that the percentage savings mentioned are additive. In most cases they are not, because the various measures described inter-react one with another. They do indicate, however, that the overall savings target of 30 per cent set by PSA is not unrealistic and, indeed, it is noteworthy that in the first full year of the new programme over £12 million of fuel saving has been recorded. A good portion of this was due to the exceptionally mild weather last winter, but with due allowance for weather, some £8·5 million of saving can fairly be ascribed to the energy conservation measures already implemented. This is equivalent to 10 per cent of the energy used across the board before the present programme was launched.

In conclusion, it should be remembered that there is no philosopher's stone in the search for improved energy economy. Only constant attention to detail in all areas and improved co-ordination by all professions in the industry will bring its reward. Even then the long-term results will continue to depend on the way in which building users respond and on the quality and effectiveness of the maintenance and operation organizations provided.

Guide for New Managers

Note by the Editor

One of the factors identified in the Wider Issues Review as underlying current discontent in the Civil Service was the quality of line management and the style and effectiveness of managers especially at junior level. As one means of tackling this problem the Review Steering Committee commissioned a *Guide for New Managers*, which has recently been published.

The Guide, prepared by the Civil Service Department Management Services (General) Division in collaboration with other CSD divisions and 11 major departments, and seen by the National Staff Side, has been written with an eye on the local office work performed by staff in the Administration Group. But the principles it outlines apply equally to the task of management in other spheres of activity. It is directed primarily at the HEO level, but many who have read the Guide have mentioned its value to more senior managers and to Executive Officers.

In layout the Guide follows a widely quoted definition of the task of management. This is that managers at all levels have to carry out four inter-related tasks—planning, organizing, motivating and controlling—and that they do so through the proper use of the staff and other resources allocated to them. Each chapter is devoted to one of the four elements in this definition and starts with a short statement of what is meant by it. Then for each element some hints are given which may help the new manager to understand better what his own managers and his new subordinates expect of him.

The response shown by departments when they saw the Guide in draft form was encouraging, and over 110,000 copies of the published version have been distributed to meet their initial demands. With the Civil Service manager in mind, we asked Mr. C. L. Sturrock, a Principal in a Government Department with large blocks of clerical staff, to review the Guide.

It has also been suggested to us that the booklet may be of interest outside the Service, and with this in mind we invited Lord Brown, a former Minister of State at the Board of Trade and author of many books and papers on organization and management, to review the Guide.

We are indebted to both Lord Brown and Mr. Sturrock for finding the time to review the Guide and for their kind comments on its usefulness as an aid to managers, especially those new to the role.

Those outside the Civil Service who wish to obtain copies of the Guide may do so from Civil Service Department (MSISS), Room 2/99, Old Admiralty Building, Whitehall, London SW1A 2AZ, price 55p (including postage). Orders should be accompanied by a cheque or postal order made payable to 'Civil Service Department'.

A Review of *Guide for New Managers* by The Rt. Hon. Lord Brown, M.B.E.

When I first took up a position in the then Board of Trade in 1965 I used sometimes to ask questions like 'Who is his manager?' The answer often was 'You mean who is his superior officer?' or something like that. The term 'manager' had not really come into general use at all in the Service.

Things have changed vastly since then. I have just finished reading *Guide for New Managers* published by the Civil Service Department—no less!

It is, as one would expect coming from that source, exceedingly well written—clear, concise yet voluminous in the advice set out.

Being put in command of others for the first time and becoming accountable for their performance is one of the dramatic initial experiences of any career. Taking up a managerial role for the first time—and I mean a real managerial role, not some blurred relationship of superiority to others who are equally unclear—rapidly exposes hitherto unrecognized personality defects. It is a new relationship with others which calls for a certain minimum degree of personal maturity. Now it is very trying indeed to be suddenly catapulted into such a situation, but if in addition one's ideas on how to behave are based solely on a superficial assessment of how one's own previous managers have done the job then the first year may prove a most harrowing experience. I speak feelingly from personal recollections some forty years distant. It was at that time that I began desperately reading Mary Parker Follet, Taylor, Fayol and others—but they didn't really help very much. I'm not decrying such stalwarts of the past, but they were short on candid, detailed and simple advice.

This Civil Service booklet intrigues me because if I had had it at that early stage of my career it might well have saved me from a number of acts, and particularly failures to act, which still make me think: 'How could I have overlooked that? What a young imbecile I must have appeared to be'.

Reviewers of books on management frequently give pen to a most tiresome cliché—something like this: 'No manager who reads this book will fail to gain something from doing so, etc.' What I would say of this CSD effort is: 'Give a copy to every young man and woman prior to their first managerial appointment.' It's only 30 pages and four appendices, but it is very meaty indeed. None of them is going to absorb and act on all of it—you would have to be a paragon of virtue and energy to do so. But a lot of it will stick if your man—or woman—is any good, and I believe that most who receive it will be very grateful for the kind of help it provides at a very crucial period.

I spent 34 years in industry followed by five working with civil servants, and my view now is that if industry were as well managed as the Civil Service some of our current industrial troubles would be much

less severe than they are today. That may sound pretty heretical to many industrial managers, but if one listens to foreigners with some experience of this country it appears that most of them think we have one of the best civil services, but are pretty scathing about our industrial effort.

It really is rather sad to hold opinions like that, but I voice them as a prelude to the suggestion to those *industrial* men who read this rather good journal that they should get hold of some copies of *Guide for New Managers* and just try out the experiment of giving it to those about to embark on a managerial career, and ask them if they did indeed find it helpful. Do some research with it.

Having waxed enthusiastic about this Civil Service Department effort I think I may be allowed to conclude with a criticism. The time is long overdue when terms like supervisor and manager should be precisely defined. This Guide describes vividly the *content* of a managerial role and the *behaviour* required to carry out that content, but it does not define the relationship between a manager and his subordinates in terms of the inescapable minimum of authority which the former must have over the latter in order to be able to be held accountable for the work of subordinates. A boundary definition of the concept of 'Manager' is missing. It is very easily constructed in terms which are completely logical and acceptable to those with experience in management. Perhaps we might look for such a definition in the next edition?

But in the meanwhile don't be put off by my criticism from getting hold of this edition. It really is good stuff. Try it out on your young men and women. The only good thing which came about as the result of the 1971 Industrial Relations Act was the *Code of Industrial Relations Practice*. This *Guide for New Managers* is of the same ilk.

A Civil Service Manager's View of the Guide by C. L. Sturrock

I was once told that management is by rote and therefore training in management is unnecessary and can achieve nothing. Knowing and even respecting my informant, I thought he did not really mean that and so I argued the point. Surely he meant common sense and if so I would go along with him. But he would have none of it.

This discussion took place some years ago, but has since recalled itself on several occasions for one reason or another and even been repeated with other protagonists. My dictionary says of rote—a frequent repetition of words without attending to the meaning or the principles of rules. If this definition is true, then all that managers need do is to mouth the recognized words and phrases and all will be well. Surely not—especially these days with all the criticisms of management that have appeared in the Press recently.

Those of us who have been in management for some years learned by experience. And by that I mean we learned—or should have learned—

from our mistakes and successes. In some ways we got into bad habits and the longer this went on, the harder it was to change even for the better. These thoughts may well provoke further discussion, the argument being that experience is the best teacher and cannot be replaced. Up to a point this is true, provided the experience is the right one; provided we have not merely stepped into the shoes of our predecessors and carried on where they left off. We have come quite a way from the old days, but there is still a way to go yet.

To that end much training has emerged with its seminars, discussions, hand-outs, case studies, etc., but, while training these days is good, is more forward looking and encourages participation, part of its troubles is that you get it only once as a rule and rarely will the whole of any course apply to the same degree to all of us. Each must take out of it what he thinks he needs. But what is more to the point, each must make a conscious effort to apply the new knowledge or skills on return to his desk. It is all too easy to agree it was very interesting and then either go back to the old ways or just forget about it.

So it is with CSD's *Guide for New Managers*. When I was first shown a copy of the booklet my reaction was something like, 'What—another one, on top of all the training that is available? What more can be said that has not already been said?' But is this really fair? All of it will not be pertinent to all new managers all the time. Much of it is pure common sense. Some of it is stating the obvious and the booklet admits to this, but it is a pity the word 'new' appears in the title. My view is that, in essence, the Guide spells out what any good manager should be doing anyway and then throws in some useful hints here and there. Each can take what he needs out of it and new managers should prove to be the more fertile ground, but there is no harm in us old managers being reminded of even the obvious. (Would that I had a pound for each time I have had said to me 'I wish I'd had some formal guidance early on in my career' or 'All this training and guidance has come too late for me'. It is never too late. It only gets that bit harder as time goes on.)

For these reasons then I approve of the booklet and commend it to all managers, but more especially to new ones. It will, however, require a real, conscious effort to put the booklet into practice and furthermore to allow it to remind us of its contents. We can all keep ourselves busy with our jobs with no time in which to do these 'new-fangled' things. That amounts to the job running us instead of us running the job. Be your own boss in that respect and become an activist manager with the booklet as your guide, if not your bible.

Flexible Working Hours—A Policy for the Civil Service

R. L. JOSEPH, Civil Service Department

In the past three or four years a great deal has been written in this country about the merits and disadvantages of Flexible Working Hours (FWH). We have no wish to add to the welter of words and we have no axe to grind other than to state that after extensive experiments in a fairly wide variety of Civil Service work situations the Civil Service Department is convinced that FWH can be of great benefit to staff and can be introduced at comparatively little cost to the taxpayer.

Having stated our conclusion at the outset, the purpose of this article is to give some account of how we arrived at it, since our approach and experience has of necessity been somewhat different from that of many commercial organizations, who were able to study FWH in relation to one organization and arrive at a set of decisions which in most cases were right for that organization. This has been true from the pioneering days in 1967 at Messerschmidt-Bölkow-Blohm onwards. The Civil Service with its half a million non-industrial staff embraces every imaginable type of work from policy formulation in a departmental headquarters to the management of naval dockyards, from the local tax office to the vast central offices of the Department of Health and Social Security. For these reasons no set of decisions about FWH taken in London could be right for every Civil Service establishment. We set out rather to establish the principles of the system and, relying on departmental discretion, to offer them to the service in the knowledge that each department or, indeed, each office or outpost would apply these principles in the light of local circumstances.

The concept of FWH is continental in origin and, although one hears of prior claims, it is generally acknowledged that the current orthodox type of FWH scheme was devised at Messerschmidt-Bölkow-Blohm. It is essentially a clever compromise between the total rigidity of an entire workforce arriving and departing at fixed times and the uncontrollable situation which would arise if each employee came and went completely at will. The compromise is achieved by posing the idea of a 'core-time', i.e. the essential part of the day when, ideally, all staff will be present. Either side of this period of the day are the flexible bandwidths when staff can come and go at will, providing, over an agreed period, they complete their contractual hours. There are many refinements which it is possible to build into schemes and some of these are discussed later, but the basic concept of FWH is simplicity itself.

By the time the idea began to be discussed in the United Kingdom the Germans had four or more years' lead and it was, therefore, sensible to do some fact-finding there. Two research officers from the Civil Service Department visited Germany in the summer of 1972 and, apart from discussions with Messerschmidt-Bölkow-Blohm, called on federal and local government, banks and other large public and private sector organizations. Their findings were reassuring and, in the course of job satisfaction projects in the Inland Revenue, nine tax offices embarked on trial FWH schemes towards the end of 1972 and the beginning of 1973.*

The word 'reassuring' is deliberately used since FWH, like other management innovations, involves change and most people dislike change and resist it. This, it was found, applied to management and staff alike. One of the main features of the experimental phase in the Civil Service was that those invited to conduct or participate in an experiment evidently felt that they were being asked to take a leap into the dark and it was instructive to hear every possible theoretical objection to the system from people who had not actually tried it. It was not always easy to counter these objections at first, except by reference to the experience with large numbers on FWH in Germany and elsewhere in Western Europe (now running into millions) and to the growing numbers in Britain, particularly in insurance and banking circles. It turned out, however, that the results from the initial experiments in the nine tax offices were generally so satisfactory that we were encouraged to spread the area of experimentation much wider. This was, of course, done in full consultation with the National Staff Side and in May 1973 there was a general invitation to the non-industrial Civil Service to experiment with FWH in consultation with the Civil Service Department and the Staff Side.

By now a number of things were becoming clearer. We welcomed every opportunity to exchange experience and ideas with bodies outside the Civil Service, with firms manufacturing attendance recording equipment and in seminars held by such bodies as the Royal Institute of Public Administration and the Industrial Society. With the knowledge obtained from the fact-finding visit to Germany and the practical experience gained from the Inland Revenue's initial experiments, we found that the basic concept of FWH could in practice be reduced to three simple precepts:

(*a*) The task of the establishment and service to the public must be maintained as efficiently under FWH as with the old fixed hours.

(*b*) So long as this happens, staff should be given as much freedom as possible in the choice of their arrival and departure times.

(*c*) The core-time constitutes management's main control over

* See *Flexible Hours Experiments* by G. Galey in the November 1973 edition of this journal.

attendance during the essential part of the day and time off during core-time is, consequently, only allowable with management permission.

To reassure management and staff about the 'leap into the dark' we soon realized that it was important to ensure that both sides fully understood the concept. This implied briefings and discussions with managers, Staff Side and staff. Once the basic concept was clearly understood, it was usually fairly easy to draw up a scheme which would suit local circumstances.

FWH are nowadays becoming a matter of routine and it is easy to forget the excitement which this basically simple idea generated two to three years ago. We adopted as a golden rule the principle that experiments only took place where staff and management wanted them; hence the widening of the experimental area was by invitation and not by instruction. If there was enthusiasm for the idea, there was also a desire to have a successful experiment and to make the system work. And so, by the time the experiments became more widespread in the latter half of 1973 we had established that the necessary ingredients for a successful scheme were:

(*a*) Staff and management enthusiasm.

(*b*) Full consultation with the Staff Side from the outset.

(*c*) Careful attention to the communications to ensure that all concerned understood the concept and the rules flowing from it.

Following the invitation to wider experimentation other departments large and small began to consider FWH and to mount experiments. Of the large departments the Department of Health and Social Security, in consultation with their Staff Side, mounted a country-wide series of experiments involving over 3,000 staff.*

As the experiments became more widespread, so the knowledge of FWH deepened and confidence in it began to build up. In some respects the Civil Service schemes were more liberal than those outside the Service, notably in respect of carrying over credit or debit hours from one accounting period to the next and allowing staff in credit to take time off for these hours in the form of half or whole days' 'credit leave'—a feature much appreciated by staff, especially those with a smaller annual leave entitlement. Visits to the Dutch and German civil service managements in 1974 revealed that this facility was not a feature of their schemes. But if the advantage of a four-week accounting period is that the individual need not home in on an exact number of hours by Friday afternoon, irrespective of the workload, so too it is an advantage to have flexibility between one accounting period and the next. Fears that staff would be consistently in debit were not borne out.

* See *Flexible Working Hours in DHSS Local Offices* by E. S. Drye in the February 1975 edition of this journal.

Indeed, studies showed that the vast majority were to varying degrees in credit, the feeling evidently being that it was better to have a few hours in credit so that if a personal need for some time off arose, the individual would already have that time in hand.

Of course, the very fact that the individual can under FWH vary his attendance daily, weekly or even four-weekly, raises the question of recording attendance in some way so that staff and their supervisors are agreed at some point in time (i.e. at the end of the four-week settlement period) that contractual or conditioned hours have been completed. It is only fair to say that the question of attendance recording has caused some uneasiness in the Civil Service, since it was only in recent years that attendance books were for the most part abandoned, and it appeared to be a retrograde step to seem to be reintroducing them or their equivalent. (But, curiously, neither staff nor Staff Side seem to object to noting overtime hours in this way.)

Of course, the FWH system can be operated on trust alone. The individual knows how many hours he should attend during the week and with the trust system management would rely on him to complete those hours. The individual who varies his attendance from day to day would, no doubt, jot down the hours attended so that he knows whether he is in debit or credit, but, of course, under a trust system he would be under no obligation to show this to a supervisor. One of the original tax office experiments was based on trust and, although there appeared to be no abuse of the system, the Chief Inspector reported that staff did not seem to make much use of it either. It is easy to see that a remark from a colleague or supervisor at the 'early' departure of a member of the staff could spoil the atmosphere in such circumstances. It is but a simple step to jot the hours down on a piece of paper for a supervisor to see (and check if he wishes). This we have labelled the manual system and it has been used successfully in many Civil Service offices in the experimental period. From the management point of view it is open to the objection that it is wasteful of costly staff time and it can lead to friction if staff suspect colleagues of rounding off attendance times in their own favour.

The rapid spread of FWH from Germany over Western Europe faced the manufacturing industry with the problem of producing a machine which would monitor attendance satisfactorily. Perhaps the simplest way of doing this was the adaptation of the industrial time-clock to FWH. Not surprisingly the white collar unions, including our own Civil Service ones, are not enthusiastic about the appearance of the industrial time-clock in a white collar environment. Nor, for that matter, are we. FWH is probably the most significant change in working conditions since the introduction of the five-day week and the use of an industrial time-clock not only smacks of the shop floor but does little to reflect the modern thinking behind it. But, apart from this consideration, there is also the objection that expensive staff time is expended on totalling hours on the clock cards. To meet these objec-

tions German and Swiss firms soon produced the lapsed time meter, which displays cumulatively the hours attended by each individual and is started and stopped by him on arrival and departure. It does not record arrival and departure times; indeed, it does not actually record anything. The display is similar to that of the car mileometer and in order to 'reconcile' the hours displayed at the end of a settlement period the total on the display must be noted down and adjustments made for sickness, duty absence and so forth. Within these limitations the meter has proved to be a relatively straightforward way of dealing with the attendance recording aspect of FWH and has generally been acceptable to staff and unions where it has been tried.

During our experimental period other equipments were coming on to the market and we were on the look-out for one which would, so far as possible, take the chores out of FWH and at the same time be acceptable to staff. Apart from the meter, the remaining equipments fall into the electronic or main-frame computer categories. Obviously the latter would only be considered when very large numbers of staff are involved and especially when an office has a computer on site with some spare capacity. Equipments from both categories were successfully tried, each having features which were advantageous in the locations concerned. The electronic type of equipment concentrates the FWH data in 'memory chips' in the master unit. The data are collected from keying terminals which are placed at points convenient to staff, e.g. at entrances and at the staff restaurant. Each individual has a coded plastic key which, when inserted in the terminal, causes his hours attended to flash on to a small screen. Since adjustments for duty absence or sick leave are injected into the system daily, the individual can discover at any time whether he is in debit or credit, since the use of a blank key at the terminal will display standard hours at that point in time and he can compare these with his own total. The main-frame computer equipment is somewhat similar, except that the terminals are badge-readers and staff do not have an immediate visual display of hours attended, but receive a periodic computer print-out.

Towards the end of 1974, with some 10,000 staff directly involved in monitored experiments, CSD was ready to discuss with the National Staff Side the wider, permanent application of the system to the Civil Service. In no experiment had there been a disaster; indeed, it is true to say that no difficulties were thrown up which could not usually be solved locally. This is not to say that on the basis of the findings to date it was assumed that FWH would, therefore, automatically be successful everywhere. Visits, for example, to Research and Development establishments revealed that the work often demanded attendance at unusual times. Staff respond to the demands of this type of work and management in turn adopt a flexible management style. Neither staff nor management could see the advantage of superimposing on these arrangements orthodox FWH schemes. This reinforced our view that FWH should not in any circumstances be imposed but should be

offered and only implemented if it was wanted by the staff and could be accommodated within the demands of the job.

The experiments in FWH have been, therefore, essentially a pragmatic exercise. We received an enthusiastic feedback from staff and at the same time came across no insuperable objections from management. The system has, therefore, been offered to the entire non-industrial Civil Service. Of course, the fact that any public expenditure at this time can only be made after especial careful scrutiny means that various projects and programmes will be competing for departmental resources and the provision of funds for attendance recording equipment will have to find its own level in departmental priorities. This may mean that the introduction or wider application of FWH may take place rather more slowly than we all would have wished. But, apart from the financial point, which is always with us, in offering the system to the Service we aimed to lay down basic principles and as few other rules as possible. A Code of Practice was agreed with the National Staff Side in similar vein. Departments and individual offices will base their schemes on these principles, but will adapt them to suit local circumstances. Full staff consultation will ensure that staff participate in formulating the scheme and will have a proprietary interest in it. This is the essence of FWH—a give and take attitude between staff and their supervisors. Apart from the obvious benefits of FWH, its widespread adoption could lead to a new and fruitful relationship between staff and management.

A Job Satisfaction Approach to a Management Problem

D. E. PACE, Civil Service Department

Introduction

For some time a small job satisfaction team attached to the Personnel Management Division of CSD has been undertaking projects in a number of departments attempting to determine the factors which influence satisfaction at work. Usually the diagnosis in a particular work situation is followed by a more active phase where a team member works with the unit concerned to help both management and staff to examine their problems, and to help develop a strategy for overcoming them.

Background philosophy

Few would doubt that Britain is presently undergoing a period of rapid social and cultural change.* For large organizations one of the most significant changes has been the impact of a radical change in attitude towards authority in the last decade. For instance, organizations can no longer automatically rely on a large measure of identification with its aims derived from membership alone—staff increasingly require organizations to earn and justify a whole-hearted commitment to organizational aims. In former days membership of the Civil Service evoked strong ties of loyalty and had consequences for the whole personality. I remember a retired civil servant saying with real reverence 'It's a wonderful thing the Service'. Not many of the newer-style civil servants gracing the front of the Wider Issues Report would recognize the sentiments. Management is no longer accorded automatic deference and courtesy nor can it rely on unquestioning application to work by staff when they see certain work practices and procedures as irrelevant. Civil servants in the recent past have been part of a rapidly growing and changing organization. They are more articulate, more critical and more confident than their predecessors. In essence the message is that the former management prerogatives and the structure which supported them have passed.

The second main philosophical thread underlying the approach is based on the ever-increasing evidence available concerning motivation

* For a fuller discussion see *Job Satisfaction in the Civil Service—a Perspective* by Keith Robertson, in the August 1973 edition of this journal.

at work, reaction to management style and organizational form. There is a degree of cynicism surrounding this whole area which is regarded by some as pandering to staff. Some might say that the Civil Service is not a benevolent organization and staff are here to do a job of work. This tendency to separate out the staff from the organization is well illustrated in a recent article on personnel management:

> Personnel management aims exclusively at getting the work of the organization done efficiently and economically. It is not concerned to make individual people contented or provide them with careers or remove boredom except in so far as these are shown to be important (as well they might be) for getting the work done.

What a bleak world! Surely there is no question about the significance of motivational factors such as responsibility and interest in the work. An organization is a dynamic concept of constantly changing human relationships formed to carry out defined tasks—which in the Civil Service also tend to change fairly frequently! Attitudes develop in satisfaction or frustration of human needs. If an organization consistently frustrates the satisfaction of needs be they material, e.g. pay, or psychological, then a sense of alienation will develop which is likely to be detrimental to getting the work done. That is why there is no fundamental conflict between job satisfaction and efficiency but a coincidence of needs.

Putting these threads together we can see the traditional management role of 'telling how to do' is fading. The crucial fact is that it takes two to make a relationship be they farm labourer and squire, or lovers. Given the research findings into the factors affecting motivation, management must attempt to adapt, together with their staff, in order to develop the work situation in a way which benefits all. No one yet knows precisely what shape this will take and each situation may require a particular approach.

The project

The project, which is described briefly in the following paragraphs, was an attempt to adapt a work situation to take account of social change. The initial diagnosis phase to production of the report lasted a month. The involvement of the job satisfaction team in launching the new approach lasted a further six weeks. Though this project represented a relatively small step in terms of implications for the organization in that it took place in a small, relatively isolated specialist section, it illustrates many of the issues discussed above. It should not necessarily be thought that the problems arising in this approach involving a small unit are any less complex or of a kind easier to solve than the problems usually faced up to by large departments.

The Accounts Section of a small department consisted of 16 staff to EO level with an HEO and SEO as managers. The staff included both sexes covering a range of age groups, ethnic groups and educational levels. The section had little direct contact with the rest of the office

and the staff tended to keep to themselves, thus creating a sense of isolation. The staff got on extremely well with each other.

The section was responsible for:

(*a*) Payment of salaries for headquarters and outstation staff.
(*b*) Keeping centralized records incorporating a keyboard accounting system.
(*c*) Capital payments and receipts and petty cash.

Problems originally arose because of staff shortage at CO level throughout the office during a period of difficult recruitment in a highly competitive labour market. Consequently staff were allocated to the section not on the basis of personal choice or aptitude but simply according to availability. As pressure of work built up, 'on the job' training was sacrificed. New recruits to accounting without suitable training or necessarily the aptitude for figure work, made errors which were compounded when recorded in the mechanized system. To add to the difficulty an HEO was appointed to the section without accounting experience and had to spend most of the time coming to grips with the system. This in turn put extreme pressure on the SEO. Supervision of the section suffered. A backlog of work built up as it became increasingly difficult to reconcile monthly then quarterly accounts, with more and more time spent searching for errors. Routine procedures began to fall into disuse and morale fell as staff became aware that they were going through the motions of keeping an accounts system rather than maintaining a relevant one. Management attempted to rectify the situation by hiring agency staff with little effect—the vicious circle was apparently too well established. Sick leave rose by 230 per cent in a year and staff turnover increased significantly. At this point management decided that the problems of morale were so serious that outside help should be sought. At the time of the job satisfaction team intervention over 50 per cent of the staff had less than six months' experience.

It is very difficult to allocate blame for this situation. Short-term pressures due to staff shortage are a well-known manifestation in the Civil Service. If one subjects a system to extreme pressure something has to give. In this case the chain reaction was particularly devastating, partly because of the nature of the specialism and partly because of the inexperience of the staff. Morale seriously deteriorated—not in a personal way—for instance the clerks responsible for salaries attended on Sunday to get the money out on time—but in terms of a group sense of helplessness. Some of the EOs concerned recognized the problems and saw ways in which the job could be adapted and simplified to meet the prevailing situation but they felt unable, owing to lack of experience, to influence it. Given a clearer responsibility for their areas of work, and encouragement to use their initiative, they might not have allowed it to deteriorate so far without action.

The most telling proof of this is that the analysis of the problems

described above came from the staff themselves. With the agreement of the Staff Side who were very enthusiastic, interviews were carried out with every member of the staff of the section and management by the job satisfaction team (together with a number outside the section for comparison purposes). The report simply reflected the views expressed by the staff, all of whom received a copy. It was not prescriptive though the analysis clearly indicated the areas, such as training and adaptations in the job itself, where action was needed. What the report did suggest was that if the staff were so well aware of the problem it would be sensible for them to contribute towards the solution as far as they wished to.

At a meeting between top management, Staff Side and the section it was agreed to accept the idea of a participative framework and to achieve this a two-tier structure was set up consisting of:

(*a*) A project group within the section consisting of EOs, SMOs (Senior Machine Operators) and COs.

(*b*) A co-ordinating committee consisting of accounts management and other internal specialists such as the internal auditor and a representative from Management Services. The section EOs and an SMO also sat on this committee to provide a linking pin with the project group.

The role of these groups was very clearly defined from the outset. In particular it was recognized that the project group would not be a vehicle for hollow consultation but would have real responsibility for identifying necessary improvements and for implementing them as far as they were able. The role of the co-ordinating committee would be to provide assistance and advice in implementing change when the project group requested help.

Progress

The results have been limited but encouraging. The project group commenced an analysis of the work with each of the account sub-areas giving a theoretical and practical demonstration to the others. With the help of the job satisfaction team the group self-administered an analytical tool developed at the Industrial Research Unit, Cambridge, by Dr. Meridith Belbin in order to determine each individual's most effective role in the group. This resulted in the joint chairmanship of the group by an EO and CO and revealed areas where the group did not have the skills they would require. Various ideas have been implemented. For instance, each member has written a set of desk instructions for his particular job to be carried out during periods of absence. All members have submitted notes to the training officer on their training requirements and a group member attended a demonstration of instructional facilities available including a demonstration of a possible method of aptitude training for accounts clerks. Supervisor training has been arranged. A visit was made to an outstation to

investigate the accounting system problems by a member of the group.

The link with the co-ordinating committee is also functioning. For instance, when the clerks felt they were unable to pursue the work analysis any further they requested help from internal Management Services who conducted a work flow analysis. Further expertise was made available by CSD if required. Other proposals presented to and developed in the committee have included improvements in ledger posting procedure, preparation of monthly expenditure progress reports and a new system for payments. This latter initiative has led to a study of a more sophisticated accounting machine to process all paying documents.

Though the project touched on problems of wide significance to the Civil Service, most importantly for the purposes of this article the project showed that most staff at a junior level are willing, within the limitations of their experience, to accept and welcome real responsibility for their work and respond with enthusiasm. The task for management must be to help develop the latent talent available in the Civil Service. It is apparent that decisions about the way the day-to-day work is done can be tackled at a fairly junior level, freeing management for more appropriate decision-taking. The project group showed themselves to be realistic—when they perceived the need for a deeper analysis for which they recognized they did not have the specific skills they requested help. Importantly, the solution was not imposed from above. Management on their side showed that they can respond to change with flexibility and vision. The Head of Division commented:

> I agree we should as far as possible allow the staff concerned to identify the problems in the work arrangements and to come up with their own solutions. . . . In our particular case I see no reason why it should not prove successful with the specialized guidance which can be provided by our own resources and by the various sources you suggested to us.

Thus the aim of the approach by the job satisfaction team was not a tepid attempt to placate a restive work force who were voting with their feet, but an effort to meet the challenge of change in a spirit of consensus and whilst consensus still prevails.

Impressions of an Outsider

J. A. E. HUGHES

John Hughes recently returned to British Petroleum after spending 20 months with Special Assignments Division, CSD Management Services. In the article that follows he gives some personal impressions of the Civil Service, and draws some comparisons between the Service and the private sector. —*Editor*

When I read Dick Owens' article 'Some impressions of a seconded consultant' in the August 1972 edition of this journal I was not to know that just over a year later I would follow in his footsteps. I have just completed 20 very pleasant months on secondment to the Civil Service Department and have been asked to describe my impressions and draw a few comparisons between the Service and the private sector. Comparisons should be treated with caution as they can be misconstrued if taken out of context and are difficult to make except in a general sense because of the very diverse nature of both sectors. Despite this I have attempted in the following paragraphs to draw a few general comparisons and to describe a few of the things that the Service and large multiple organizations have in common. I then briefly describe the Management Review work on which I was engaged, in the belief that the Civil Service approach to this subject has a lot to commend it and could be of interest particularly to the non-Civil Service reader.

The reader should appreciate that my views are based on a superficial knowledge of the Service and are biased by the particular areas in which I was working. However, my overall impression of the Service as Dick Owens so aptly put it ' is of a skilful and dedicated team grafting away at an exceedingly difficult game and putting up a fine score'.

The Service compared to Business

While padding around Whitehall I heard civil servants remark 'the Civil Service is different from business'. Some writers in this journal and elsewhere have expressed similar views and have used them to justify their claim that a commercial approach and business management methods and techniques are not appropriate to the Service. I was surprised at the similarities when comparing the Service with my own company, British Petroleum. Both employ large numbers of staff and experience similar problems at the centre—in particular the extent to which authority and responsibility can be delegated and the arrangements for planning and allocating resources and for exercising control. Both organizations are very much concerned with increasing efficiency and reducing costs and are endeavouring to improve their planning

and control processes and their accounting and management information systems and to extend the concept of accountability for individual managers. This leads me to believe that in terms of organization and management problems and style there are probably more significant differences between a small business and a large multiple business organization than there are between the latter and the Civil Service.

The similarity between the public and private sectors was noted by Lord Armstrong in a recent interview with *The Economist* when he said, 'I have been very struck by the similarity between the problems of a clearing bank in relation to staff recruitment, training, deployment and so on and those in the Civil Service'.

When illustrating the differences some writers compare the collaborative nature of civil servants and their excellent teamwork with the competitive, individualistic and profit-orientated nature of individuals within the private sector. In a general way this comparison may be valid, but it hides the fact that in all large, private organizations there is a need for a blend of these styles. Planning and constructing a refinery or carrying out research and development work, for example, could not be carried out without a high degree of teamwork and to most of the BP staff engaged on such projects the profit that will accrue is too remote a concept to mean very much to them in their day-to-day work. Their main objective is to ensure that the projects are completed to the required standards as quickly as possible and at the minimum cost. No doubt the objectives for many areas within the public service could be expressed in comparable terms.

There are, of course, differences. One which I particularly noted is the extensive staff representation and consultative machinery embodied in the Whitley system in the Civil Service. The fact that almost all civil servants belong to a union or staff association can be contrasted with many areas in business where many thousands of workers (particularly white collar workers) have no representation at all.

The similarities and dissimilarities between the public and private sectors have been discussed many times by more qualified commentators than me. A more fruitful debate would be concerned with determining which business management concepts and techniques are appropriate to the Service and how they can be applied. It is my impression that many of them can be adapted to meet the requirements of the Service particularly those relating to planning and control and management information and financial systems upon which some of the other concepts such as repayment, accountability of individual managers and hiving off depend. The concept of repayment (often called charging out) is increasingly being adopted in business often with considerable impact on company operations. This is usually followed by systematic objective setting for units and individual managers.

This is probably a logical sequence in that the introduction of repayment tends to force management to look at their objectives critically. In the Service, repayment has been considered, but there

does not appear to be the necessary drive to implement the concept fully while MbO has been applied for some time with considerable success. I suspect that in certain situations repayment forces management to face up to some hard decisions while MbO is probably easier to live with.

It is my impression that despite the very tight controls (or perhaps I should say 'constraints') that are maintained over expenditure there would be benefit from adapting more of the commercial financial concepts to the needs of the Service—in particular those concepts relating to the use of financial information for evaluating options and taking management decisions. I do not believe there should be a one-way traffic. On the reverse side of the coin many private concerns could learn something from the Civil Service practices—in particular the staff representation and consultative machinery that I mentioned earlier and the concept of management review that I describe in the following paragraphs.

Management review

The Special Assignments Division to which I was attached was set up to carry out management reviews rather than the normal consultancy assignments concerned with specific problems within a circumscribed area of activity. A management review is a broadly based study dealing with the totality of an organization and the wider issues at the top level rather than detailed systems and procedures, although on occasions these are studied if they are relevant to the particular review. The reviews are carried out by teams which vary in size and composition. Most include staff from the department under review, who contribute their knowledge and experience of the department, and staff from the Civil Service Department Management Services who contribute their expertise as management advisers and their experience in carrying out reviews in a variety of situations. Most teams have an outside consultant (so perhaps there is scope for an article in this journal describing the Civil Service impression of an outsider!). The Management Services members of the team and the outside consultant face the problem experienced by consultants in a similar situation in commerce, namely, what is the best contribution they can make bearing in mind that the team leader and the majority of team members are usually unversed in management review work.

Generally a steering committee of senior officials is set up to oversee the arrangements for the review, to receive the team's discussion papers and consider their proposals. There is a tendency to present very comprehensive and well-produced discussion papers and reports to the steering committee rather than rely on oral presentations. Although committing everything to paper is time consuming it has the advantage that one is forced to think through the subject properly and it helps to clear one's mind. In business one tends to look for shortcuts and rely more on oral presentations with brief summary notes and reports.

Conduct of a review

The first stage of a review involves a considerable amount of background reading. I recall spending several days reading and analysing certain sections of the Merchant Shipping Act 1894 and even longer reading what seemed to be countless papers, reports and files in order to understand the background to a particular assignment. It seemed to me that when preparing a paper civil servants feel duty bound to describe the history and background of the particular subject in order to produce a comprehensive and well rounded document. In the commercial world one is generally not concerned so much with recording what has happened in the past.

The team then moves on to study the role of the organization and its structure, they diagnose the problems and the critical areas requiring closer study and gain an understanding and 'feel' for the organization. During this period members of the team are able to get to know each other and form into an effective unit and develop a rapport with the senior officials within the organization. More time is spent on the preliminary survey than is normal in the commercial world. In two of the reviews in which I was involved 20–25 per cent of the total assignment time (six months in each case) was spent on the preliminary survey. This is reasonable bearing in mind the open-ended nature of a review as compared to a normal consultancy assignment for which there is generally a more restricted and specific brief. The information collected at this stage is invaluable during the course of the main review and even at this early stage hypotheses are developed. On balance I would favour this lengthy but thorough approach as the decisions taken at this stage significantly affect the conduct and outcome of the review.

The approach adopted by Special Assignments Division is to examine the organization critically and to use their findings in a constructive rather than a destructive manner. They eschew the notion expressed by some proponents of management review that they should audit the performance of individual managers. They see their role as providing advice to senior officials on the management structure and its main supporting systems for analysing policies and controlling resources. As one senior member of the Division remarked 'it is arrogant for a consultant to tell a manager how he should do his job'. Their collaborative approach ensures a fairly high degree of success in that the results of the review are agreed, decisions are taken and agreed changes are implemented at a pace the organization can sustain. This is realistic given the need to gain a wide measure of agreement amongst many interested parties both inside and outside the department concerned before making any changes. Inevitably it leads to compromise and the need to accept a slower rate of progress than some would perhaps wish. However, to a certain extent this is also true of large multiple business organizations.

Because a management review is open-ended but has to be com-

pleted within a limited time span specific topics have to be selected for study. Special Assignments Division are continually seeking to improve the review process and one approach used during the reviews in which I was involved and which I believe has considerable merit was to take a particular topic and consider it as a system composed of sub-systems which in turn are composed of activities. A descriptive and diagrammatic definition was prepared of the activities one would ideally expect to find in the system. This was then compared with what was actually found in the organization under review. From the comparison it was possible to comment on the discrepancies and suggest options for improving the current situation.

Manpower was one of the topics which was handled in this manner and deemed to be composed of three sub-systems relating to:

- Planning and control. The purpose of this sub-system is to ensure the correct numbers and types of staff are available at the right moment in time and place. The activities within the sub-system are manpower planning, control and utilization and succession and career development planning.
- Personnel management. This looks at the individual and is concerned with such activities as recruitment, training, promotion, etc.
- Staff relations. This looks at man in his environment and the fact that management and staff interests are not identical and that groupings external to the organization exercise an influence leading to the need for negotiating machinery with staff associations and unions.

The definition of the system was prepared and used without the need for any alteration when reviewing the manpower systems in three organizations which were in the same business but each of which had a very different management structure and management style. This enabled the review team to cover a wide area in a relatively short time without on the one hand being too superficial and on the other producing an indigestible amount of material. The approach also helped to provide consistency in the comparisons and judgments made by the review team. This approach is similar to that advocated by the proponents of the 'systems' view of organization. It is interesting and although requiring more development and testing I believe it has potential for wider application in management reviews outside as well as inside the Service.

Some general impressions

During my period of secondment I was involved in reviews of HM Coastguard and the Headquarters of the three General Lighthouse Authorities. Being an ex-mariner both of these proved fascinating as once more I had the chance to stand on the bridge of a ship at sea, to pore over charts and to peer out to sea from a Coastguard lookout. This was only a short but very welcome relief from the strenuous pro-

gramme of work that was necessary to complete the studies. Many hours were spent travelling the country to interview people, writing reports in hotel rooms, even at the weekends, and arriving home weary late at night. The pace of work was certainly no easier than one would find in business.

In general I found the Service environment receptive to consultancy because of the civil servants' willingness to spend time discussing the facts and logic of a situation and to put aside their personal preferences in order to arrive at a balanced judgment. It is reassuring to be asked by a senior official not to 'pull your punches' when reporting on an organization for which he is responsible. They tend to discuss problems and decide the action to be taken by consensus of view rather than by autocratic dictum which is more prevalent in commerce. Discussions are carried out in a very gentlemanly fashion but with a sophisticated ruthlessness. As a union official said to me 'when a civil servant says "with respect" he thinks you have said something foolish and if he says "with the greatest respect" he probably thinks you are an idiot'.

Before joining the Service I expected to find a highly structured, bureaucratic system, but in Management Services I found a friendly atmosphere with a high degree of informality. I did not detect on the part of the civil servants any resentment against this outsider intruding upon them. On the contrary they appeared to appreciate the contribution I could make. It was useful during my first few weeks to have a civil servant nominated as my mentor to guide me through the tortuous paths of the system and explain the conventions. Throughout my period of secondment I received much kindness and help particularly from the Central Support Branch, who amongst other things organized the printing of reports, and the secretary who typed copious notes and reports and assisted with the utmost efficiency.

Conclusion

In summary, I feel that large multiple business organizations and the Civil Service have a lot in common and the Service would benefit by adopting some of the business management concepts. On the other hand business would benefit by adopting some of the Service concepts particularly Management Review. Finally, my impressions were formed while working with an experienced and professional group (Special Assignments Division), who I suspect may be somewhat more receptive to outside influences and more progressive than many Civil Service groups, and my comments should be read in this light. My period of secondment was originally set for 12 months but was extended to give a total period of 20 months about which I was more than happy because of the pleasant working environment and because one gained the feeling that the work is worth while and produced results. I certainly enjoyed the 20 months and found it a most useful experience and I am indebted to colleagues in the Civil Service Department, the Coastguard and the Lighthouse Authorities for their kindness and help.

Use of Microfiche for Periodical Literature

J. F. G. BURTON, Department of the Environment

John Burton is an HEO in the Management Services (O & M) Division of DOE, specializing in the field of microfilming systems. In the article that follows he describes a recent assignment on which he was involved and which resulted in useful cost and other benefits. —*Editor*

Introduction

The Property Services Agency (PSA) of the Department of the Environment is the largest single design and construction organization in the country. The Agency is responsible for the provision and maintenance of accommodation for government departments, research establishments, the Diplomatic Service, Post Office Corporation and the armed services at home and overseas.

To discharge this responsibility the Agency employs in the United Kingdom some 10,600 professional, technical and drawing office staff engaged on all aspects of design, construction and maintenance, and in support of these activities staff need to be backed up by an up-to-date library of technical information.

The Agency's Headquarters library in London is responsible for supplying printed information to four Headquarters Directorate and two special libraries, Scotland, Wales, and eight regional libraries in England. The range of published books, periodicals, reports, pamphlets and standards supplied to these libraries is small by comparison with the amount of material acquired by the Headquarters library for its own use. The cost, however, of providing every library in the network with all the construction literature currently acquired at Headquarters, together with providing staff, accommodation and equipment would be prohibitive.

Nevertheless, much of this information is of direct interest at directorate and regional level, as is illustrated by the case of periodical literature.

The problem

The Agency receives approximately 900 periodical titles each year and from these around 300 articles from about 350 titles are selected as being of particular interest to each library. These are recorded in a classified card catalogue; the more important are abstracted in a fortnightly current awareness service, *Current Information in the Construction Industry*,

and all appear in a six-monthly consolidation known as *Construction References*, both of which are available outside the Service.

Apart from the cost and the handling and storage problems of providing every library in the network with copies of all relevant periodical titles, much of the contents of periodical literature is advertising matter for which trade literature is, in many cases, already available.

Periodicals were, therefore, retained at Headquarters and enquiries were constantly being received in the Headquarters library when the information was not available at directorate or regional level. Two enquiry officers (Librarian III) were engaged full time in answering these enquiries, of which some 40 per cent relate to periodical literature; much of their time was spent on search and retrieval, sometimes necessitating a journey to the periodical section in another part of the building. Enquiries were then answered either by photocopying the article or issuing the periodical on loan.

The problem fell into three categories:

(*a*) To make a greater amount of information available over a large area of the country, keeping within existing accommodation, staff and storage limitations.

(*b*) To reduce the amount of loans work at the London Headquarters library.

(*c*) To relieve valuable space in the Central London library and reduce the cost of storing periodicals.

To overcome this dilemma it seemed sensible to consider the use of microfilm technology as an ever increasing amount of information was becoming available in this media, and, indeed, much of this information is available only in microform. Low-cost duplication of microfilm would enable every directorate and regional library in the PSA network to have access to items of special interest which, hitherto, had been held only in the Headquarters library in London.

Which microform?

In devising a microfilm solution to the problem it was necessary to consider all microfilm formats in use at the time:

(*a*) Aperture cards were considered unsuitable because, although the median number of pages per article is ten the range is very wide and articles containing up to 90 pages are not uncommon. Several aperture cards would be needed to contain articles of more than 16 pages.

(*b*) Cassettes and cartridges can hold between 2,000 and 2,500 documents on 100 ft. of 16mm film, but input material would have to be held until sufficient articles were collected to utilize a complete film. Duplication would necessitate copying a complete film when, perhaps, only 20 or 30 frames would be required. These formats also needed more sophisticated retrieval equipment of limited availability.

(*c*) 16mm and 35mm on open spools would present the same constraints that would be experienced when using cassettes or cartridges except that a wider range of machinery was available.

(*d*) Many micro-publications were already received in the Headquarters library on microfiche, a single piece of film measuring 6 in. × 4 in. and capable of holding up to 98 pages of information. By adopting this format existing retrieval machinery could be utilized and a proliferation of equipment avoided. Low-cost duplication would enable single microfiche to be duplicated, when necessary, as a unitized information package.

It was, therefore, decided to use microfiche for containing the articles. To conform to probable future British and International Standards, a 98-frame format was selected which enables an average of about nine articles to be contained on one microfiche. In terms of duplication costs, 98 pages of information on a single microfiche could be copied for less than 10p compared with around 3p per A4 page by photocopying process. Periodical literature contains both text and illustrations. In microform, text projects better in a negative polarity where detail appears as a clear image on a dark background thus avoiding glare from the light source on the reading equipment. Illustrations on the other hand are better in a positive polarity. In this case text was the main consideration so a negative polarity was selected.

In view of the relatively small number of articles to be processed into the system, the provision of in-house filming facilities which would include a microfiche camera, film processing and other ancillary equipment requiring specialized staff was not considered to be an economic proposition. A microfilm service bureau was therefore employed.

Costings

The annual cost of providing this service amounted to around £9,800 in 1972 when the investigation was carried out. Of this some £6,400 was spent on accommodation and storage equipment while staff costs accounted for another £3,100; a further £300 was spent on photocopying relevant articles in answer to enquiries.

By introducing a microfilm system, obvious benefits in storage and retrieval would be obtained and it was estimated that a 50 per cent saving would be made in accommodation and staff effort. A microfilm system was costed as follows:

	£
Accommodation	3,200
Staff cost	1,550
Machinery (annual cost) . .	840
Microfilming and duplicating . .	550
	£6,140

Cost benefit was, therefore, to the order of £3,700 per year.

The system

The success of a microfilm system depends upon an effective index leading to easy and speedy retrieval.

In the case of periodical literature the fortnightly and six-monthly publications show, against each abstract, a unique code reference for identifying the appropriate microfiche.

The first operation in the system is to select the relevant articles in each periodical; this is carried out by a 'reader' who marks up the articles considered to be of significant interest. The articles (known as references) are then abstracted and given a UDC (Universal Decimal Classification) and a unique microfiche reference number based on the year of publication and a strict numeric sequence within that year (75/1, 75/2, etc.). Articles are then removed from the periodical and collated into 'fiche files'; on average each file will contain nine articles.

All material must be prepared into a common format before being presented to the camera. Fortunately many journals conform to a standard A4 page size which is particularly suited to the 98-frame microfiche format. Precise instructions to the camera operator are given on an input control grid sheet set out in a 98-frame format indicating what should be filmed frame by frame.

Immediately preceding the article is a white card (A4) bearing the unique code reference of the article in characters large enough to be read on the microfiche with the unaided eye.

Duplicate copies of the microfiche are distributed to the Headquarters library and to each regional, directorate and special library in the network.

Retrieval equipment

Facilities for printing back from the microfiche have been installed only in the Headquarters library where hard-copy can be obtained on request, if essential. A reader-printer with interchangeable lens facilities was selected because it could be adapted to accept both 16mm and 35mm reels as well as microfiche. The fiche attachment is kept permanently in place as this format is predominantly in use. A reel attachment has been provided to allow reference to some older 35mm material should this be necessary.

Each library is equipped with portable readers which may be borrowed by users when prolonged study is necessary; and a small microfiche duplicator has been provided to meet requirements for single fiche on an as needed basis for use within the Department.

System in use

As in most cases teething troubles occurred, but these were overcome by a close liaison between Management Services, the library and the service bureau.

Initially the collection of material for filming worked on the principle that the library would contact the bureau when a batch of files was

ready for filming; the processed microfiche and the duplicates would be returned when the following batch was ready. There was no regular pattern to the collection frequency and the trend was to hold material back until a fair sized batch of fiche files had been collated, thus delaying the distribution of the duplicate microfiche to the regional and directorate libraries. To overcome this and to avoid the build up of a backlog of work a regular fortnightly collection and return procedure has been set up, which enables the duplicate fiche to be circulated to the other libraries at the same time as the abstracts appearing in the fortnightly current information bulletin.

So far almost 4,000 articles have been microfilmed and are contained on 380 microfiche occupying the equivalent of about 18 inches of shelf space. By comparison one year's issues of the journal *Building* alone would take up around 24 inches. It has also been possible to withdraw journals from circulation much earlier and a two-year holding period has been cut down to nine months thus releasing valuable space for other material.

Professional staff at regional and Headquarters directorate level have welcomed the new system which gives instant access to information required. Requests for hard-copy have been few and in the main have been confined to Area Works Offices where portable readers were not available.

Arrangements are now in hand to extend the system to Area Works Offices bringing the number of user points to 62 in the UK and Western Europe. Static readers are also being provided in each library thus releasing the portables for loan issue.

Reader reaction has been favourable and in many cases enthusiastic. The benefits of the system, in particular paper and space savings, the reduction of loans work at Headquarters and a wider range of material immediately in the regional and directorate libraries, will become increasingly apparent as time goes by.

The future

Now that we have adopted microfiche for periodical literature our aim is to maximize the use of the resources that have been provided.

It is intended to produce a master catalogue on COM (Computer Output on Microfilm) of the monograph accessions of the Government libraries participating in the Interdepartmental Libraries' Cataloguing System (INTERLIB). The Chief Librarian has accepted a microfiche format for the PSA catalogue which will be made available down to Area Works Office level. Microfiche readers with dual lens facilities for use with both conventional 98-frame microfiche and the 208-frame COM formats will enlarge the range of material available in the Area Works Offices.

Another development is an examination which will shortly commence on the possible use of microfiche for the libraries pamphlet collection. The present holding is about 75,000 items with an accession rate of

3,500 items per annum. It is likely that these too could be held and disseminated on microfiche.

Trials are in progress where microfiche is being used for product information (trade literature). Particular features of the trials include the use of colour microfiche for certain items and the importance of illustrations as opposed to text where silver-halide duplicate microfiche are being used.

Thus by selecting a microfiche format a system has been introduced that can easily be extended and developed within the micropublishing area throughout the PSA Library network.

Fuel Economy

Note by the Editor

Recent developments have served to emphasize the need to exercise all possible economy in the use of fuels. In an article in this edition Mr. Johnston and Mr. Gronhaug have described the work being done by the Property Services Agency in the field of energy economy in Government buildings; and in Book News there is mention of a new Management Services Handbook—*Transport Management*—which includes as an appendix some suggestions on ways of achieving fuel economy in the transport field.

The subject is of such importance that we think it would be useful to reproduce for *MSIG* readers the 'hints and tips' given in the appendix to the handbook.

Transport managers and support staff

The effective organization and control of vehicles is as important as the way in which the vehicles are driven. Transport managers and staff should:

- plan and co-ordinate journeys to ensure as far as possible that vehicles have full loads (i.e. passengers and freight) and that drivers can go from one job to another covering minimum mileage
- instruct drivers to telephone base on arrival at destination if no return job has already been planned; urgent jobs or suitable pick ups may have arisen since their departure
- ensure that sufficient time is allowed on journeys to avoid excessive speeds
- use vehicles best suited for the job in hand (e.g. the smallest suitable vehicle)
- choose road routes carefully (e.g. to avoid city traffic hold-ups)

— reduce air drag on vehicles by careful loading on load carrying vehicles (e.g. large items first and smaller items at the front and on top)
— remove roofracks when not in use (tests have shown that empty roofracks can increase fuel consumption by as much as five per cent)
— use public transport for passengers where appropriate (this should always be considered as an alternative both to official vehicles and to the use of private cars on official business)
— for freight carrying consider the use of public road hauliers who may have spare capacity available, as an alternative to the use of official vehicles.

Drivers

The way in which a vehicle is driven has a direct effect on fuel consumption—fast driving is not compatible with economy. For example, a typical 2,000 c.c. vehicle operating at constant speed shows deterioration in consumption as follows:

30 mph — 38 miles per gallon;
40 mph — 37 miles per gallon;
70 mph — 25 miles per gallon.

Furthermore, under rapid acceleration from a standing start it will give only nine miles per gallon for the first quarter-mile and 11 miles per gallon for the first half-mile.

Some general points for drivers to watch include:

— use the gears to get the best out of the engine; do not 'rev' the engine unnecessarily; anticipate changes in gear; do not race up to traffic lights or stop signs and brake sharply
— every use of the brakes is a waste of energy (i.e. fuel)
— automatic gears are generally less economic than manual gears; the less pressure on the accelerator the lower the speed at which the gear will change; particularly when starting 'kick down' on the accelerator will increase fuel consumption
— with synchromesh gear boxes it is not necessary to double-declutch and accelerate the engine to match the road speed (it also wastes fuel)
— using the engine to brake wastes fuel
— avoid spillage when filling fuel tanks; check immediately any suspected fuel leakage from any source on the vehicle and arrange for necessary repairs
— switch off the engine if any undue waiting period is foreseen
— when switching off either for a short period or overnight it will not lead to easier starting if the engine is 'revved to leave the carburettor full'
— always ensure the correct grade of fuel is used
— tyre pressures below recommended pressures increase fuel con-

sumption so check regularly that pressures are maintained to manufacturers' recommended levels
— use correct lubricating oils in accordance with manufacturers' recommendations
— never use fuel as a cleaning aid
— check rate of fuel consumption regularly and if excessive report to Transport Office
— ignition settings should be in accordance with the manufacturers' specification
— carburettor settings (mixture) and jets should be in accordance with manufacturers' recommendations
— ensure that sparking plugs are always clean and have the recommended gap setting.

Book News

MANAGEMENT SERVICES HANDBOOKS—FORMS CONTROL, CENTRALIZED DICTATION SYSTEMS, TRANSPORT MANAGEMENT

Published by the Civil Service Department in the General Service Forms series

Three further titles in the Management Services Handbook series prepared by CSD's Management Services (General) Division have recently been published: *Forms Control* (E. 130), *Centralized Dictation Systems* (E. 132) and *Transport Management* (E. 133).

Forms Control is primarily intended to give guidance to staff in Management Services units of Government Departments who are involved in assignments leading to the introduction or improvement of forms control procedures. It is also likely to be helpful to Office Services staff, such as Clerks of Stationery, who are responsible for handling forms.

The handbook draws attention to the fact that although the production costs of Civil Service forms is high (the paper costs alone amount to some £14 million a year) the administrative and labour costs of processing a form are thought to be of the order of 20–25 times the cost of production. It is clear that badly designed or controlled forms can result in a considerable waste of resources. The principal aim of the handbook, therefore, is to give advice on how to achieve more efficient procedures and work methods through the use of the minimum number of well designed and produced forms.

The topics covered in *Forms Control* include organizational considerations, classification and indexing, control procedures, forms production and storage and stock control. Much of this material is based on the experience of practitioners in government and commerce in the United Kingdom and the United States. The benefits and drawbacks of particular approaches have been set out to enable the reader to choose the most suitable for his or her circumstances.

Centralized Dictation Systems, like its companion handbook *Typing Services* (E. 125)

published earlier this year, is intended primarily for Management Services practitioners, but it contains useful advice to users or potential users of centralized dictation systems.

The handbook describes the basic form of centralized dictation systems and discusses the benefits of centralizing the audio dictation function. Other chapters are concerned with calculating the requirements and the preparation of a case for a centralized system. A chapter on the importance of training for users is supported by an appendix which gives the content of a typical training programme.

Transport Management is intended to provide some practical guidance to civil servants who, for the first time, assume responsibility for an area of activity which, because of its technical basis, is likely to be strange to them.

There is no magic formula for operating a transport organization economically and efficiently, and the handbook is not intended in any way to cover in detail the whole field of transport. It covers briefly those aspects which concern the day-to-day running of a transport organization.

The introduction to the handbook points to the fact that transport is an essential element in the life of Government Departments. Given the contantly increasing cost of vehicles, maintenance and fuel, departments must be seen to be doing all possible to operate a sound transport organization. Appendices give hints on maintenance supervision and fuel economy which should help to achieve this.

Although the three handbooks have been produced with a background of Civil Service experience, the subjects have been treated in a general way and, therefore, may be of interest outside the Service. Government Departments may obtain copies through their normal publication demand procedures; outside bodies may obtain copies from the Civil Service Department (MSISS), Room 2/100 Old Admiralty Building, Whitehall, London SW1A 2AZ. Prices are *Forms Control*—60p, *Centralized Dictation Systems*—45p, and *Transport Management*—55p; all prices include postage. Orders must be accompanied by a cheque or postal order, made payable to 'Civil Service Department'.

Two publications have been received recently from publishers. Space does not permit a full review, but a note of their title, contents and cost is included below.

The Computer Users' Year Book 1975. Published by The Computer Users' Year Book, 18 Queen's Road, Brighton, Sussex BN1 3XA, price £13.50 plus postage. This is the seventh edition and has 860 pages—over 100 more than the previous edition. Sections of the book cover most aspects of computer operation, and include recruitment and training; computer standards; programming languages; equipment and supplies; computer consultants; service bureaux; and a directory of computer installations, which has been reorganized to make it easier to find installations in major towns and elsewhere. Further details may be obtained from the publishers.

ESSENTIAL PSYCHOLOGY is a series of 36 books, published by Methuen & Co. Ltd., that covers most of the field of psychology. The series is split into six units. Unit E is concerned with psychology and work and the first two books in the unit have now appeared. They are E.1 *Psychology and Work* by R. Davies and V. J. Shackleton—a general introduction to the unit—and E.3 *The Psychology of Training* by R. Stammers and J. Patrick. Later books cover selection and assessment; men and machines; and motivation at work. Unit B on social psychology is also relevant, especially B.4 *Social Psychology of Organizations*.

Letter to the Editor

The views expressed in letters to the Editor are the writer's own, and not necessarily those of his Department.

What makes man management so difficult?

Dear Editor,

In a labour-intensive activity like the work of the Civil Service, it is clearly important to attract, retain and make sensible use of suitable individuals. Not surprisingly, recruitment, selection and training have long been established interests in the personnel management area. More recently, there has been increased concern to demonstrate that personnel management cares for staff individually, and does not concentrate solely on the remote management of anonymous groups. For example, job appraisal reviews and career interviews have become important aspects of a formally acknowledged scheme, and line managers encouraged to show some real feeling for the personal needs and aspirations of members of their staff.

In brief, there is a move towards better appreciating the individual in the detailed setting of his or her job. One of the consequences of collecting and understanding personal information may well be a noticeable increase in the variety and variability of recorded data. Science and technology have generally encouraged behavioural scientists to study groups of people, and to describe observations in terms of central trends. For average behaviour allows broad generalizations which are obviously useful, while preoccupation with a single soul may only occasionally yield insight in breadth.

But should one attempt to say more? Why are human beings so difficult to understand and therefore to manage? At the philosophical level, the age-old answer might be that the person attempting to understand humanity is human too, and shares limited abilities with the general. To use an image, a single radio transistor could hardly hope to comprehend the current transmission, let alone the reasoning behind the programming decisions.

Suppose, however, that it is in each individual's interests not to be understood. Put scientifically, suppose that survival depends on being unpredictable. The man management task then becomes a conflict of sorts, between the long-term needs of the race and the shorter-term needs of the non-plussed planner. Not to mention the perhaps mixed feelings of the individual!

The usual explanation is that people are impossibly complicated. But it might be that people are in fact essentially simpler than they make out, that each of us behaves in accordance with a minimum of simple promptings while appearing highly complex. Though this is no new idea, the range of interpretations is endless.

Consider how complicated and bewildering a range of behaviour could be based upon a few carefully chosen but nonetheless commonplace notions, say three. For example, the Civil Service is very well aware that it needs clever administrators who are prepared to take risks. (Conversely, grown individuals in society invariably wish not to be thought stupid or fearful, even when they are so.) Here might be two indispensable personal factors: the ability to solve problems and the possession of controllable emotional energies in the face of uncertainty. The Civil Service also values people who are educated and thus enjoy a broad range of activities and

interests. This could represent a third ingredient essential to the personal recipe; experience of the world, including the world of problems.

As any mathematician or physicist will realize, three unknown variables are quite enough to generate the ultimate in obscurity and incomprehensibility. Further, we can honour our obligation to the biologists by being seen to include heredity and environment in the recipe. 'The ability to solve problems' and 'the capacity not to be over-bothered by unsolved problems' might be primarily genetic in nature, leaving 'the problems one has seen and solved or not' as the major environmental influence.

Nor does complication stop at this rather intellectual level. There will be problem-grappling parallels in the deepest, perhaps forgotten, recesses of private life. In particular, learning to cope with one's earliest (meaningless) experiences will have been shaped by apparently chance events, and these events would comprise detailed personal awareness, perplexing contacts with other people, and seemingly haphazard encounters with the physical world. Thereafter, apparently unaccountable differences between individuals would develop cumulatively. Certainly there is enough scope here to people the world with infinite variety, and to deny any terribly accurate self-knowledge.

While your reader may enjoy trying to appreciate his closest acquaintances in the light of these three basic factors, that is hardly the point. For if the foregoing is largely correct, the exercise will be eternally inconclusive by definition. Rather the object is to give notice that human frailty gives man managers a most piquant problem, that of understanding people who may profoundly need to remain a warm and wonderful mystery.

Yours sincerely,

H. F. Huddleston
Civil Service Department

Computer Installations for Government Departments

A list of all Government computers as at 1st January 1975 was published as a supplement to the May 1975 edition of Management Services in Government; details of computers ordered during the period January to March 1975 were published in the August edition.

Only one computer was ordered (for administrative and general purposes) during the period April to June 1975. Details are as follows:

Date of order	June 1975
Department	Ministry of Agriculture, Fisheries and Food
Location	Guildford
Main uses	Bureau work for MAFF
Manufacturer	International Computers Limited
Type of computer ..	ICL 1904S

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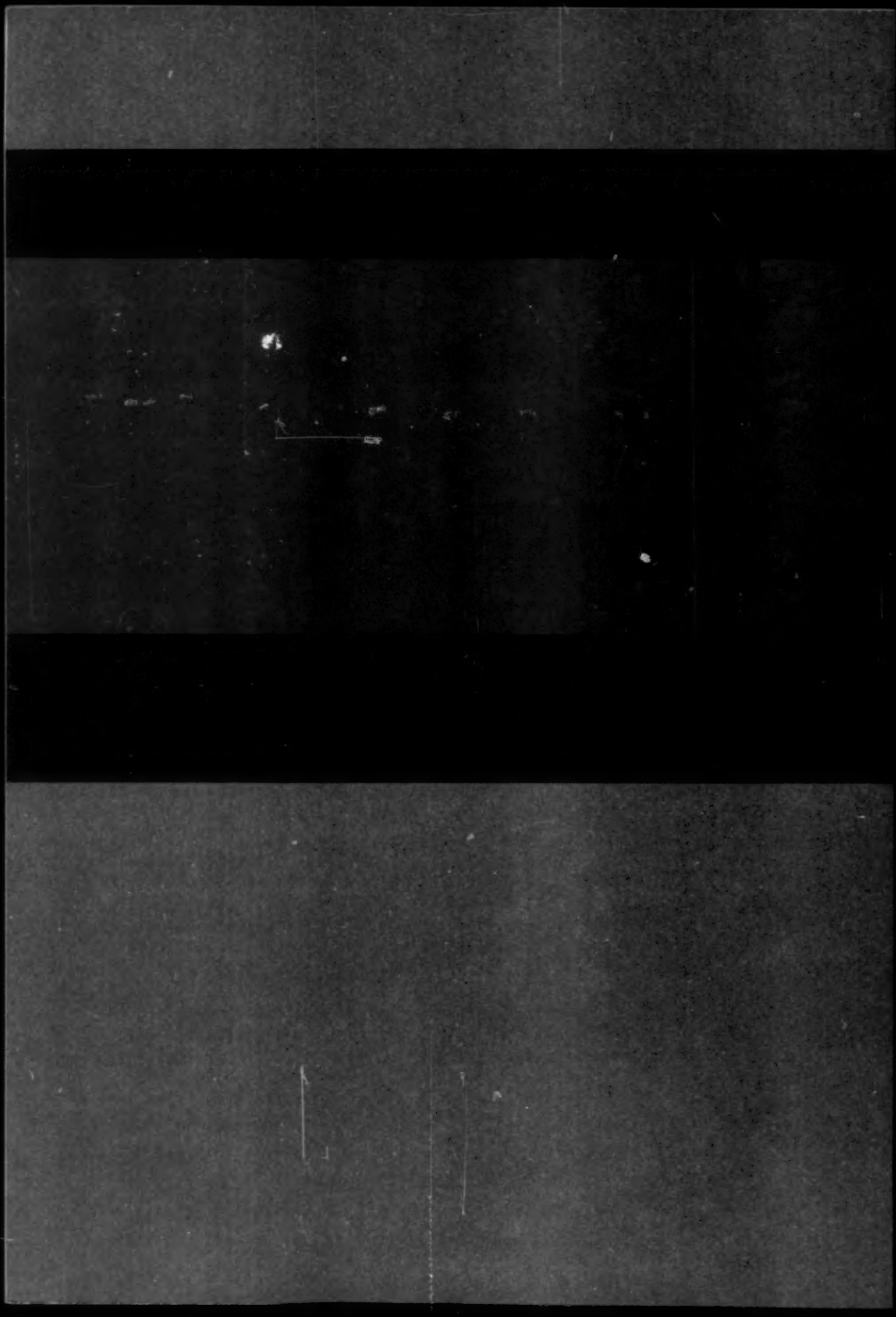
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